The principle of short-circuiting of threat: further evidence[1]

Richard S. Lazarus, Edward M. Opton, Jr., Markellos S. Nomikos, and Neil O. Rankin, *University of California, Berkeley*

The purpose of this experiment was to test the generality of the principle that manipulation of beliefs about events can short-circuit threat, that is, can alter the cognitive process of appraisal so as to diminish or eliminate the stress response to a stimulus which otherwise would be threatening.

In a recent paper, Speisman, Lazarus, Mordkoff, and Davison (1964) showed that the stress response to a film called "Subincision" could be reduced by experimental sound tracks based on concepts of ego-defense. The sound tracks were designed to alter Ss' appraisal of the film events in the direction of less threatening interpretations of the stressful content. One sound track, called "intellectualization," encouraged a viewpoint of emotional detachment, the other, called "denial," assured the viewer that the crude surgical operations on the penises of adolescent boys were not painful, that there was no danger of disease, and so forth. Speisman et al. (1964) advanced a theoretical interpretation of the reduction of stress response produced by the sound tracks, they suggested that the sound tracks altered Ss' appraisal of the film events, that is, their beliefs about or orientation toward the meaning of what they observed, so that the contents of the movie were less threatening. Subsequently, Lazarus and Alfert (1964) demonstrated that statements intended to shortcircuit film-induced threat need not accompany the film. They presented a "denial" interpretation as an orienting statement and obtained essentially the same results as had been obtained with the sound tracks in the earlier study.

These findings were interpreted as showing that the same event may be threatening or not depending on how its contents

[1] This investigation was supported by Research Grant MH-02136 from the National Institute of Mental Health, United States Public Health Service.

are appraised That is, the threat inherent in a film is not solely a property of the pictorial stimulus but is also determined by a cognitive process of appraisal If stress reactions are avoided by such an appraisal of potentially threatening events as will render them nonthreatening, the threat is said to have been "short-circuited"

Two limitations of the previous studies restrict the generalizations which may be drawn from them In the first place, the process of shortcircuiting, produced by the experimental effort to influence Ss' orientation toward the film events has been shown to occur only with one film, a film dealing with the unfamiliar, esoteric subincision ritual of the primitive Arunta tribe. It seemed important to determine whether the same principle could be applied to threats produced by other kinds of motion picture films Secondly, the "intellectualization" sound track was used only in the study in which its defense-orienting passage was played along with the film (Speisman et al, 1964). The Lazarus and Alfert (1964) study used only the denial passage. It seemed likely that the intellectualization statement would shortcircuit the threat when employed as an orientation before the film, just as the denial passage did, but this had not yet been demonstrated

In the experiment to be reported here, a different stressor film was used, and both denial and intellectualization orientation passages were presented. The aims were to ascertain whether the results of the previous experiments could be replicated and extended to other stress films, and to determine which of the defense-orienting statements would be more effective in reducing the physiological stress reactions.

METHOD

Sixty-six college students were randomly assigned to three experimental conditions, each condition containing half male and half female Ss with 22 Ss in each The Ss included three graduate students, four students of Greek extraction, two Orientals, and three Negroes. In addition, six Ss were unpaid, while the remainder were referred through the student placement office and were paid $2 00 per hour Since these special characteristics might have had a bearing on the results, care was taken to distribute them evenly among the experimental conditions

The three experimental conditions were defined by three tape-recorded orientation passages which the Ss heard before viewing of the stressful motion picture film One passage was constructed in accordance with the principle of denial, a second was based on the concept of intellectualization, and the third constituted a control condition, in which a brief descriptive summary of the events portrayed in the film was given The descriptive summary of the control condition gave facts leading to an expectation of disturbing film content, just as did the defense-oriented passages, but the control orientation suggested no particular mode of defensive coping with the film The three orientation statements are given below

1. *Control* We have been conducting a series of investigations on the effects of motion picture films on physiological and psychological reactions The short film you are going to see is a portrayal of two woodworking shop accidents In one a worker runs the tips of his fingers through a ripsaw In the other, a worker loses a finger These incidents are used by the shop foreman to give the men a lesson in safety practices

2. *Denial* We have been conducting a series of investigations on the effects of motion picture films on physiological and psychological reactions The short film you are going to see now was designed to frighten industrial employees into faithfully using safety devices. You will see the portrayal of two woodworking shop accidents, one in which the worker runs the tips of his fingers through a ripsaw, the other in which another worker loses a finger As you watch the film, remember that the people you see are actors, and none of them is actually injured. While every effort was made to give the impression of reality, it is all completely faked.

One's awareness of fakery is enhanced by the poor acting ability of the participants. In order to give the impression of bleeding, red dye is squeezed from the palm of the hand, and where necessary, a finger is made to appear missing by properly concealing it, and by effective photographic work The accidents are both staged because it would have been almost impossible to have made such a film based on real life incidents Everything is done to make you believe that the fictitious events are real.

3 *Intellectualization* We have been conducting a series of investigations on the effects of motion picture films on physiological and psychological reactions The short film you are going to see deals with an effort to train men in the use of safety devices In doing so, two woodworking shop accidents are presented In one a worker runs the tips of his fingers through a ripsaw, and in the other, a worker loses a finger The events

> portrayed are interesting to analyze, and we may view them from the point of view of the socio- and psychological dynamics of the situation.
>
> A shop foreman is endeavoring to train the men in the use of safety devices. The pattern found here is typical of what might be observed in industry, which has been greatly concerned with accidents and their prevention. In the film you will see a foreman giving detailed explanations of the way in which the safety devices work. When the first accident occurs, he capitalizes on it, using it as an object lesson to the rest of the men, showing them what might have been done to prevent it, demonstrating the mechanical features of the guards on the machine, and explaining in detail how they work.
>
> In order to bring home the point, he remembers an experience of Armand, one of the older shop workers, an experience which has had a great influence in leading Armand to respect and use the proper safety devices. In using the past episode, he calls upon Armand, whom he knows will give him support in this matter, to tell his story, which is presented in the flashback. Armand's story reveals the value of direct experience with object lessons in influencing behavior.
>
> As you watch the film, you may reflect upon the psychodynamics revealed by the interchanges between the people, and be analytical about the devices used by the foreman to influence the men in the shop, that is, the psychological processes that are involved. This frame of reference is of course used by the psychological scientist as he observes, analyzes and understands these processes.

Because the threatening events of the film employed in the present study were different than those of the subincision movie employed in the previously cited studies (i.e., Speisman et al., 1964, Lazarus & Alfert, 1964), the precise statements in the orientations of denial and intellectualization as originally created were not preserved. In the present case, denial was induced by emphasizing the fact that the events portrayed were actually staged rather than real, and that the workers in the film were only actors who did not actually suffer injury. The intellectualization orientation was effected by encouraging a detached, analytic attitude toward the film, but without implying that the personal disasters were not actually sustained by the participants.

Stress reactions to the film were assessed, as in the previous studies, by heart rate and skin conductance continually recorded during the film presentation by the same instruments as in the previously reported studies.

The sequence of procedural steps in the treatment of Ss was as follows

1 After S was seated in the experimental chair, two zinc electrodes were attached to his palms, two heart rate electrodes were placed on his left forearm and right calf, and a pneumographic strain gage was placed around his chest[2] Concurrently, *E* gave minimal explanations about the measuring devices, e g, "This will enable us to monitor your heart rate," etc

2 S was asked to relax for a period of 12 minutes, "to give the paste a chance to make good contact with your skin" This period actually permitted *E* to obtain a baseline against which to measure the effects of the motion picture film This base level was defined as the arithmetic mean of the 12 readings taken at 10-second intervals during the last two minutes of this period

3 One of the pre-taped orientation passages was presented through the movie projector loudspeaker

4 Immediately after the orientation passage, the 13-minute film was presented with its normal accompanying sound track which provides the interactions between the shop workers and the foreman and accents the drama of the threatening events

The film itself has been shown in previous research (Birnbaum, 1964, Alfert, 1964) to produce substantial stress reactions It is an industrial safety education film called, "It Didn't Have To Happen," which aims at inducing safety-mindedness in wood mill operators by portraying three accidents which stem from carelessness in skilled workmen's safety practices First, a worker lacerates a finger in a planer Later, another worker amputates two joints of a finger in a milling machine The third accident occurs when because of carelessness a worker allows a circular saw to drive a board through the abdomen of an unsuspecting workman who happens to be passing by just at the moment the board flies out of the saw The man dies, writhing and bleeding on the floor Because of the flashback character of the second accident episode, there is a period of anticipation of the accident when stress responses mount The third accident is also "telegraphed" to the viewer long before it happens and results in marked anticipatory buildup of disturbance in the viewer

Data Collection and Processing

Autonomic data were reduced by means of a Benson Lehner Oscar K chart reader. First, maximum readings of skin conductance

---

[2] The pneumographic strain gauge was employed because of the original intention to measure respiration as well as heart rate No use of the respiration data was made, however, because of other evidence that it would add little to our measurement of stress reactions, offered numerous complications, and raised issues that were not germane to the inquiry

(SC) and heart rate (HR) were recorded for each 10-second interval over the last two minutes of the base period, as well as during the entire course of the film In this way a semicontinuous curve of each autonomic measure was obtained based on a considerable number (87) of samples. However, since our experience in previous related research suggested that the clearest and most meaningful comparisons of the effects of experimental conditions can be made at periods of peak reaction (in the present film, the three shop accidents), the records were inspected and it was found that for every S the maximum point of skin conductance and heart rate associated with each accident always occurred within 2 (10-second) intervals prior to or following the point designated as the accident's "confrontation" point Since these points fell during the 32nd, 64th, and 79th intervals, no accident-related maximum skin conductance or heart rate occurred outside intervals 30 to 34, 62 to 66, and 77 to 81 Therefore, it was on the basis of these three periods that the groups were compared. Each S's stress response score for a particular accident was defined as his maximum skin conductance and heart rate reading drawn from the five-interval segment surrounding the point at which the accident occurred

The heart rate readings were smoothed by the method of moving averages recently described by Malmstrom, Opton, and Lazarus (submitted for publication) This procedure takes into account the cyclic, homeostatically controlled nature of heart rate and improves the correspondence of heart rate with both skin conductance and with the known impact of points in this film In addition, the raw data for both heart rate and skin conductance were analyzed by covariance[3] using the baseline mean as the covariate As mentioned in the previously cited studies (e g, Lazarus & Alfert, 1964), the effect of this procedure is to correct the raw data for the intergroup variations in mean base level One obtains, in effect, base-to-film change scores from which have been removed the effects of the correlation between base score and change score, if any (Benjamin, 1964)

RESULTS

The characteristic effects of the film are illustrated in Figures 1 and 2, which show covariance-corrected skin conductance and heart rate curves for the three experimental conditions The curves of each variable show four major peaks one when the projector starts (interval 13), and three corresponding to the three accidents The single exception to this pattern occurred

---

[3] The University of California at Los Angeles BIMD 14 computer program and the IBM 7090 computer of the University of California, Berkeley, expedited the analysis of covariance

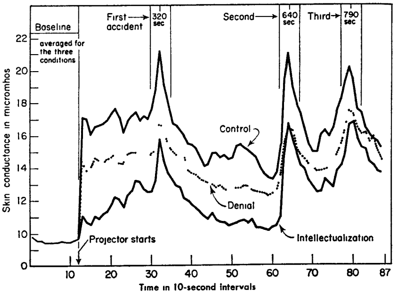

Figure 1 Effects of the experimental conditions on skin conductance (baselines equalized by covariance adjustment)

in heart rate for the intellectualization condition, for this group of Ss, starting the projector produced no increase in heart rate (Figure 2) Although the peak autonomic responses for the accident scenes occurred within the measurement intervals corresponding to the confrontation with the actual accidents, rising values appeared in the anticipation scenes represented by the measurement intervals immediately preceding the accidents In contrast, the response to the starting of the film occurred wholly between intervals 12 and 13, there having been no signal that the film was about to begin

Using the method described earlier, skin conductance and heart rate scores were calculated for each experimental group and each accident scene These scores can be found in Tables 1 and 2, which show that for all three accident scenes, and for both skin conductance and heart rate, the lowest scores (least reaction) were obtained from the group of Ss who had heard the intellectualization orientation passage. The scores of the group who heard the denial passage were intermediate, and the control

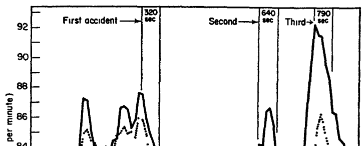

Figure 2 Effects of experimental conditions on heart rate (baselines equalized by covariance adjustment)

Table 1 Effects of experimental conditions on skin conductance maximum reached during each accident scene[a]

Experimental Conditions	Accident Scenes									Means for Accident Scenes Combined		
	1st[b]			2nd			3rd					
Control	21 57[c]			21 75			20 95			21 42		
		10			10			n s			10	
Denial	17 08		01	17 11		10	18 24		n.s	17 48		10
		n s			n s			n s			n s	
Intellectualization	15 74			16 87			17 69			16 77		

[a] Figures corrected to remove covariance with baseline

[b] Comparison of control vs denial and intellectualization conditions combined significant at 05 level

[c] Maximum conductance in micromhos.

group showed the largest reactions, both for skin conductance and heart rate, and for all three accidents

Not all of the differences are statistically significant, however. In particular, there are no significant differences among condi-

Table 2 Effects of experimental conditions on heart rate maximum reached during each accident scene[a]

Experimental Conditions	Accident Scenes									Means for Accident Scenes Combined		
	1st[b]			2nd[b]			3rd[b]					
Control	92 01			92 34			98.72			94 36		
		n.s			n s			n.s.			n.s	
Denial	87 64		05	88 52		05	91 40		05	89 18		005
		n s			12			n.s			10	
Intellectualization	83 44			84 04			86 25			84 58		

[a] Figures corrected to remove covariance with baseline

[b] Comparison of control vs denial and intellectualization conditions combined significant at 05 level

[c] Maximum heart rate in beats per minute

tions for the third accident scene for skin conductance (Table 1), there are no significant differences between the intellectualization and denial groups for skin conductance, and there are no significant differences between the control and denial groups for heart rate

The most consistently significant differences are the relatively large ones between the control group and the intellectualization group. For skin conductance these differences in reaction are significant for the first accident ($p < 01$), and they approach significance for the second accident and for the accidents combined ($p < 10$) For heart rate the control-intellectualization differences are significant ($p < 05$) for all three accidents, and for the accidents combined ($p < 005$)

Thus, although there is a variable pattern of statistical significance levels—some differences between groups being significant and others not—the direction of results was invariant The control group consistently had the highest values of both skin conductance and heart rate, the denial orientation group was intermediate, and the intellectualization orientation group had the least reaction.

DISCUSSION

The findings in the present study leave little doubt of the potency of orienting passages in shortcircuiting the threat normally produced by motion picture films The principle of shortcircuiting is not limited to the esoteric film "Subincision" on which the previous research had been performed (Speisman et al , 1964, Lazarus & Alfert, 1964), nor is it limited to statements inducing an attitude of denial Neither can it be explained as an effect merely of the preparation inherent in the defense orientations (since they inform S of some of the major threatening contents of the film), for a synopsis of the threatening content was also contained in the control condition in the present study

If the effect of the orienting passages were only to produce verbal reports of decreased stress, it would be questionable whether shortcircuiting of the threat really had occurred In that case, one would suspect that the denial or intellectualization "propaganda" merely suggested to Ss what the expected response to the film should be, and such reports would have left some doubt whether the threat really had been reduced The marked reduction, however, of both heart rate and skin conductance indicators of stress reaction after the denial and intellectualization orientations makes it clear that shortcircuiting of threat did indeed occur

Our view is that the orienting passages act to shortcircuit the threat which the film otherwise would produce, and that this shortcircuiting is accomplished by modification of appraisal—that is, the interpretation, the recognized meaning—of the events in the stimulus film The theoretical sequence posited by this view is similar to the conceptual statement put forth by Arnold (1960) and is consistent with Schachter and Singer's (1962) emphasis on cognitive processes as critical in determining emotional reaction[4]

---

[4] We do not wish to suggest that emotional reaction is merely a matter of thinking Rather we agree with Arnold (1960) that no symbolic stimulus or cue is threatening or benign aside from the way it is interpreted As Hamlet put it, "for there is nothing either good or bad, but thinking makes it so," (*Hamlet*, Act II, Scene 2) The cognitive interpretation and the emotional effect of a stimulus is determined not only by the objective properties of the stimulus but also by factors within the psychological structure of the individual such as motivation and prior knowledge Our orientation passages provided a prior knowledge which allowed Ss to adopt a threat-reducing attitude toward the stimulus film The principle alternative to the hypothesis that cognitive appraisal is crucial to threat production is the "conditioning" hypothesis, exemplified by this recent statement "In general it is quite clear that classical Pavlovian or respondent conditioning can adequately handle the problem of visceral arousal As a matter of fact, the evidence is by now so clear and overwhelm-

From a more practical viewpoint, the results of this experiment, taken together with the results of Speisman et al (1964) and Lazarus and Alfert (1964), indicate that the ability of verbal statements to reduce the stressfulness of film-induced threat is not limited to one condition of stress or one type of prophylactic measure. Still, one qualification or limiting factor must be noted The stress-reducing passages in all of these studies share at least one quality the orienting passages and sound tracks were, on their face, somewhat plausible The intellectualization passage in this study, for example, did not attempt to distort the perception of reality, it only suggested the adoption of a detached, analytic attitude toward the film and its shocking accidents In professions which require dealing with human tragedy (for example, the physician), it is common, perhaps essential at times, to adopt a detached attitude.

In the present experiment, intellectualized detachment was a most effective way in which to view the film with a minimum of stress reaction Likewise, the denial passage did not strain Ss' credibility It reminded Ss that the accidents were not real but were staged by professional actors The "denial" in this case was literally true In contrast, in the Speisman et al. (1964) study, the denial sound track was not so plausible, it stated that the operations on the genitals of the aborigine boys were not painful, while the film showed the boys writhing and grimacing in what looked like extreme pain In this case the denial sound track was less effective in reducing stress for student Ss than was the more plausible intellectualization message Mechanic (1962) noted a possible similar effect in his field study of graduate students preparing for crucial examinations reassurances by the students' wives failed in their purpose if they were, in the students' estimation, implausible Also, Jones and Kohler

---

ing, that the process whereby situations arouse visceral emotional responses, whether it be through first, second, or even higher order conditioning, need not be debated any longer Important details about the parameters of such processes are still in doubt, but the basic psychological—if not the physiological—mechanisms linking environment and visceral response are fairly well known" (Mandler, 1962, pp 323-324) It may be possible eventually to arrive at a rapprochement between "cognitive" and "conditioning" formulations of the links between environmental stimuli and stress responses, but we do not believe that day has arrived, nor that "the process need not be debated any longer"

(1958) have demonstrated the importance of plausibility of arguments in the selective learning of controversial statements. The conditions under which plausibility can be overridden in defending against threat pose important, unresolved research issues

One point of difference between the film used in this experiment and the subincision film used in the earlier work (Speisman et al, 1964, Lazarus & Alfert, 1964) warrants comment With the industrial safety film used in this experiment, Ss regularly produced autonomic records with three peaks of response corresponding quite closely in time to the three bloody accident scenes. In other words, the majority of Ss (approximately two out of three) showed autonomic curves which were visibly similar to the composite group curves of Figures 1 and 2 In the subincision movie, on the other hand, the stressful scenes are more extended in time, more complex in their meaning and probably in their psychological impact, and much more variable in terms of the autonomic responses they produce In the earlier studies which used the subincision film, a large proportion of individuals did *not* produce heart rate or skin conductance records which were similar to the composite group curves Although Ss rate the two films as about equally stressful,[5] the pattern of autonomic reaction is much more variable with the subincision film than with the safety film

The two kinds of stressor film are thus appropriate for different kinds of research If one wishes to study the interaction between personality or social variables and a rich, complex source of stress, a film such as subincision is advantageous But if one plans normative research, in which individual differences are to be minimized, and in which a universally similar stressful impact is to be manipulated, then a film such as the shop safety film employed here is desirable, for it produces stable group results with a much smaller number of Ss

SUMMARY

Sixty-six college students watched a stress-inducing film, "It Didn't Have To Happen," after having first listened to one

---

[5] McGurk, E, Opton, E M, Jr, & Lazarus, R S, unpublished data

of three tape-recorded orientation passages The "denial" orientation emphasized that the events to be portrayed were actually staged rather than real, and that the actors in the film did not actually suffer any injury The "intellectualization" orientation encouraged a detached, analytic attitude toward the persons and events portrayed in the film, but it did not challenge the reality of the events shown The "control" orientation simply gave a synopsis of the film content

The effects of the orientation passages on response to the film were assessed by two physiological variables, skin conductance and heart rate, both recorded continuously during the viewing of the film

The group of Ss who had heard the "control" orientation had the highest skin conductance and fastest heart rate averages, the "denial" group was intermediate, and the group that heard the "intellectualization" orientation showed the least stress response. Analysis of results for different portions of the film showed that some differences between groups were statistically significant, others not But the direction of differences was wholly consistent throughout the film. the "control" group always showed the most response, and the "intellectualization" group always showed the least

These results confirm and extend the findings of previous studies in this series (Speisman, et al 1964, Lazarus & Alfert, 1964) orienting information which influences beliefs about or attitudes toward the film can reduce the stress induced by the film. The cognitive appraisal of the significance of what is apprehended is crucial in determining the emotional reaction to a stimulus

It should be noted that this experiment did not test the limits of the possibilities of reducing stress reactions by appraisal-modifying communications For example, in this study both of the experimental orientation statements were designed to be credible In real-life stressful situations, as opposed to vicarious ones such as watching a film, credible directions for reappraisal of the situation may not be so readily available.

REFERENCES

Alfert, Elizabeth Reactions to a vicariously experienced and a direct threat Unpublished doctoral dissertation, Univer of California, Berkeley, 1964

Arnold, Magda B *Emotion and personality* Vol 1 New York Columbia Univer Press, 1960

Benjamin, Lorna S Statistical treatment of the law of initial values (LIV) in autonomic research A review and recommendation *Psychosom Med*, 1963, **25**, 556-566

Birnbaum, R Autonomic reaction to threat and confrontation conditions of psychological stress Unpublished doctoral dissertation, Univer of California, Berkeley, 1964

Jones, E E, & Kohler, Rika The effects of plausibility on the learning of controversial statements *J abnorm soc Psychol*, 1958, **57**, 315-320

Lazarus, R S, & Alfert, Elizabeth The short-circuiting of threat by experimentally altering cognitive appraisal *J abnorm soc Psychol*, 1964, **69**, 195-205

Malmstrom, E, Opton, E, Jr, & Lazarus, R S Heart rate measurement and the correlation of indices of arousal *Psychosom Med*, Submitted for publication

Mandler, G Emotion In R Brown, E Galanter, E H Hess, & G Mandler, *New directions in psychology* New York Holt, Rinehart & Winston, 1962 Pp 267-340

Mechanic, D *Students under stress* New York Free Press of Glencoe, 1962

Schachter, S, & Singer, J E Cognitive, social and physiological determinants of emotional state *Psychol Rev*, 1962, **69**, 379-399

Speisman, J C, Lazarus, R S, Mordkoff, A M, & Davison, L A Experimental reduction of stress based on ego-defense theory *J abnorm soc Psychol*, 1964, **68**, 367-380

Manuscript received February 8, 1965

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.